

REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Office Action dated 26 August 2004.

In the Official Action, the Examiner objected to several specific instances of informalities in the Specification. The Specification has now been amended to overcome the Examiner's objections. The Examiner also objected to the Drawings for inconsistencies with reference numbers. Corrected formal drawings have been submitted to overcome the Examiner's objections. The amendments incorporated in the Specification and Drawings are purely formal in nature and therefore introduces no new matter.

The Examiner objected to minor grammatical errors in the claim language, but allowed Claims 5 – 8. These errors as well as other similar errors have been corrected and the claims have been amended to overcome the Examiner's objections.

In the Official Action, the Examiner rejected Claims 1 – 4 under 35 U.S.C. § 103(a) as being unpatentable over Yamaguchi, et al. (U.S. Patent #5,936,322) in view of Matsunobu, et al. (U.S. Patent #6,242,837).

Before discussing the references relied upon by the Examiner, it is believed beneficial to first briefly review the structure of the invention of the subject Patent Application, as now claimed. The invention of the subject Application is directed to a

rotor for a motor. The rotor is comprised of a body formed by multiple silicon steel sheets securely abutting one another. Each silicon steel sheet has a through hole centrally defined therein to define a passage in the body for receiving a shaft of the motor and multiple apertures defined in an outer periphery thereof at equal intervals to define multiple grooves in an outer periphery of the body. A magnet element is longitudinally securely received in a corresponding one of the multiple grooves in the body. Each aperture has a bottom and an opening defined in the outer periphery of each of the silicon steel sheets opposite to the bottom of the aperture. The opening has a width narrower than that of the bottom. Centrally corresponding to the bottom, a raised portion having an arcuate contour extends from the bottom of each of the apertures in each of the silicon steel sheets toward the opening. The raised portion abuts a bottom of the magnetic element when the magnetic element is received in the groove in the body for forming a magnetic field with a sine wave due to the rotating rotor. Two concave portions are respectively defined in two opposite ends of the bottom of each of the apertures and extend radially and circumferentially to the raised portion centrally located between the two opposite ends. That structure is neither disclosed nor suggested by any combination of Yamaguchi, et al. in view of Matsunobu, et al.

The Yamaguchi, et al. reference discloses a permanent magnet type synchronous motor. The motor 15 has a rotor 37 that has a body "formed of a plurality of stacked steel plates and is mounted on a rotor shaft 27. A plurality of permanent magnets 105 are

disposed on the outer peripheral face of the rotor 37, circumferentially spaced. The permanent magnets 105 are fixed in position between end plates 106, 107 provided at the opposing ends of the rotor core.” “The rotor core 135 is provided with protrusions 136 protruding radially outward between the permanent magnets 105. The circumferentially opposed ends of each protrusion 136 are provided with lips 144, 145 overlapping and holding the permanent magnets 105 against the core in opposition to centrifugal force.” The groove receiving magnet 105 appears to be substantially flat with small recesses in protrusion 136. Therefore, the Yamaguchi, et al. reference fails to disclose or suggest two concave portions that are respectively defined in two opposite ends of the bottom of each of the apertures and extend radially and circumferentially to the arcuate raised portion centrally located between the two opposite ends, as provided by the invention of the Subject Patent Application. In fact, the reference teaches away from the instant invention.

The Matsunobu, et al. reference does not overcome the deficiencies of Yamaguchi, et al. The Matsunobu, et al. reference discloses a permanent magnet rotary machine and an electric vehicle using the same. The permanent magnet rotary machine includes a stator 1 and a rotor 6. The rotor 6 has an iron core 7. “The rotor iron core 7 is constituted by laminating a large number of the silicon steel sheets in which holes for forming the receiving portions for the permanent magnets 8 are formed.” These holes are formed to receive magnets 8 that are of the same shape and do not leave any gaps between the

magnets 8 and the iron core 7. Therefore, the Matsunobu, et al. reference also fails to disclose or suggest two concave portions that are respectively defined in two opposite ends of the bottom of each of the apertures and extend radially and circumferentially to the arcuate raised portion centrally located between the two opposite ends, as provided by the invention of the Subject Patent Application.

Therefore, the combination of the Yamaguchi, et al. in view of Matsunobu, et al. cannot make obvious the invention of the Subject Patent Application, as now claimed since neither reference discloses or suggests the combination of elements of the invention of the Subject Patent Application, and in fact teach away from that combination.

In the Official Action, the Examiner rejected Claims 1 – 4 under 35 U.S.C. § 103(a) as being unpatentable over Kajimoto, et al. (JP 08009599) in view of Kawamoto, et al. (U.S. Patent #4,954,736).

The Kajimoto, et al. reference discloses a permanent magnet type rotor. The rotor includes eight fan-shaped cores 1 consisting of magnetic bodies that are arranged apart in circumferential direction. “A circular part consisting of a magnetic body is made inside the fan-shaped cores 1, and the circular part 11 and the fan-shaped core 1 are coupled integrally with each other by connections, and the width is made narrower than the inside width of the fan-shaped core 1. Permanent magnets 2 are set in the grooves between eight fan-shaped cores 1 and the circular part 11, and those are fixed, being bonded to the plane parts provided at the periphery of the circular part 11. Moreover, vacant spaces 14

are provided between both sides of the connection 12 and the corners of the permanent magnet 2. A shaft 3 is set and fixed at the center of the circular part 11. The magnetic resistance of the connection 12 is large, and a great part of the magnetic fluxes of the permanent magnet 2 flow in radially outward direction.” As shown in Figure 2 of the Kajimoto, et al. reference, the vacant spaces 14 are clearly polygonal (five included angles) and are not rounded in any way. There is no centrally disposed arcuately contoured raised portion contacting the magnet either. Therefore, the Kajimoto, et al. reference fails to disclose and in fact teaches away from a structure with two concave portions that are respectively defined in two opposite ends of the bottom of each of the apertures and extend radially and circumferentially to the arcuate raised portion centrally located between the two opposite ends, as provided by the invention of the Subject Patent Application.

The Kawamoto, et al. reference does not overcome the deficiencies of Kajimoto, et al. The Kawamoto, et al. reference discloses a permanent magnet rotor with magnets secured by synthetic resin. The Kawamoto, et al. reference discloses a rotor core 10 of multiple steel sheets 12 with magnets 17a – 17d longitudinally securely received in a corresponding body on the outer periphery of the rotor core 10 to obtain the desired magnetic force. The magnets have a semicylindrical shape with the rotor body having a complementary contour. Therefore, Kawamoto, et al. fails to disclose or suggest two concave portions that are respectively defined in two opposite ends of the bottom of each

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of the apertures and extend radially and circumferentially to the arcuate raised portion centrally located between the two opposite ends, as provided by the invention of the Subject Patent Application.

Therefore, the combination of the Kajimoto, et al. in view of Kawamoto, et al. cannot make obvious the invention of the Subject Patent Application, as now claimed, since neither reference discloses or suggests the combination of elements of the invention of the Subject Patent Application, and in fact teach away from that combination.

For all the foregoing reasons, it is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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AMENDMENT TO THE DRAWINGS

The attached drawing sheets include changes to Figures 2 – 5 and 7 and replace the original drawing sheets having Fig. 2, Fig. 3, Fig. 4, Fig. 5, and Fig. 7 thereon. In Figures 2, 3 and 5 the reference to “113” has been removed. In Figures 4 and 7, the axis labels “(v)” and “(t)” have been removed.

Attachment: Five replacement sheets.